

WHAT IS CLAIMED IS:

1. A substrate processing apparatus performing a predetermined process to a substrate, comprising:

- 5 a process tank to store a predetermined processing liquid;
 a holding element to hold a substrate in said process tank;
 a processing liquid supply element to supply a heated processing liquid to said process tank;
 a process chamber to perform drying of a substrate, said process chamber being
10 disposed above said process tank;
 an inert gas supply element to supply an inert gas into said process chamber;
 and
 a displacement element to displace a substrate held by said holding element from a first position at which a substrate is immersed in a processing liquid to a second
15 position at which the substrate is not immersed in the processing liquid, under condition that said inert gas supply element supplies an inert gas into said process chamber after the temperature of the substrate is elevated by a processing liquid heated in said process tank.

2. The substrate processing apparatus according to claim 1 further
20 comprising:

 a process chamber temperature control element to control the atmosphere of said process chamber so as to be in a heated state.

3. The substrate processing apparatus according to claim 2 wherein
25 said process chamber includes a translucent member, and

said process chamber temperature control element is a heating element of light radiation type and disposed in the exterior of said process chamber.

4. The substrate processing apparatus according to claim 1 further
5 comprising:

an exhaust element to exhaust the atmosphere of said process chamber under condition that a substrate held by said holding element is displaced from a first position to a second position by said displacement element.

10 5. The substrate processing apparatus according to claim 1 wherein
said processing liquid supply element supplies a chemical solution to said process tank.

6. The substrate processing apparatus according to claim 1 wherein
15 said processing liquid supply element supplies said process tank with a pure water heated to not less than 70°C, as said predetermined processing liquid.

7. The substrate processing apparatus according to claim 1 wherein
said processing liquid supply element includes a bubble suppressing element to
20 suppress bubbles contained in a processing liquid before it is supplied to said process tank.

8. The substrate processing apparatus according to claim 1 wherein
said inert gas supply element includes a filter element to clean said inert gas
25 supplied into said process chamber, said inert gas supply element supplying said inert gas

from an upper surface of said process chamber through said filter element.

9. The substrate processing apparatus according to claim 1 wherein
said inert gas supply element includes a purge element to discharge said inert
5 gas into said process chamber.

10. The substrate processing apparatus according to claim 9 wherein
said exhaust element includes an exhaust port provided in said process chamber,
said exhaust port being located in the vicinity of the liquid surface of said predetermined
10 processing liquid stored in said process tank, and
said purge element is located in the vicinity of above said exhaust port.

11. The substrate processing apparatus according to claim 9 wherein
said purge element discharges said inert gas in a direction substantially parallel
15 to the liquid surface of said predetermined processing liquid.

12. The substrate processing apparatus according to claim 1 wherein
said inert gas supply element includes an adjusting element to adjust the
humidity of an inert gas supplied into said process chamber.
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13. The substrate processing apparatus according to claim 1 wherein
said inert gas supply element includes an inert gas temperature control element
to control an inert gas supplied into said process chamber so as to be in a heated state.

25 14. The substrate processing apparatus according to claim 1 wherein

said holding element holds a substrate such that the face of processing of the substrate is substantially parallel to a vertical direction in said process chamber.

15. A substrate processing method of performing a predetermined process to a
5 substrate, comprising the steps of:

- (a) supplying a heated processing liquid to a process tank;
- (b) immersing a substrate in said process tank in a heated processing liquid;
- (c) supplying an inert gas into a process chamber; and
- (d) displacing, under condition that an inert gas is supplied into said process

10 chamber after the temperature of a substrate is elevated in said step (b), the substrate from a first position at which a substrate is immersed in a processing liquid in said process tank to a second position at which the substrate is not immersed in the processing liquid.

16. The substrate processing method according to claim 15, further
15 comprising the step of:

- (e) controlling the atmosphere in said process chamber so as to be in a heated state.

17. The substrate processing method according to claim 15, further
20 comprising the step of:

- (f) exhausting the atmosphere of said process chamber under condition that a substrate is displaced from said first position to said second position in said step (d).

18. The substrate processing method according to claim 15 wherein
25 said step (a) supplies said process tank with pure water heated to not less than

70°C, as said heated processing liquid.

19. The substrate processing method according to claim 15 wherein
said step (a) includes the step of:

5 (a-1) suppressing bubbles contained in said predetermined processing liquid
before supplying it to said process tank.

20. The substrate processing method according to claim 15 wherein
said step (c) includes the step of:

10 (c-1) cleaning an inert gas supplied to said process chamber and supplying said
inert gas from an upper surface of said process chamber.

21. The substrate processing method according to claim 15 wherein
said step (c) includes discharging said inert gas into said process chamber by a

15 purge element.

22. The substrate processing method according to claim 21 wherein
said step (c) includes discharging said inert gas in a direction substantially
parallel to the liquid surface of said predetermined processing liquid.

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23. The substrate processing method according to claim 15 wherein
said step (c) includes the step of:
(c-2) adjusting the humidity of an inert gas supplied to said process chamber.

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24. The substrate processing method according to claim 15 wherein

said step (c) includes the step of:

(c-3) controlling an inert gas supplied to said process chamber so as to be in a heated state.